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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,987	02/18/2004	Randhir P.S. Thakur	500996.02 (30014/US/2)	5377

7590 12/15/2005
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EXAMINER

LUU, CHUONG A

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.		Applicant(s)	
	10/781,987		THAKUR ET AL.	
	Examiner		Art Unit	
	Chuong A. Luu		2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-37 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 21-37 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/17: 1/11/2005; 12/20/2004</u> | 6) <input type="checkbox"/> Other: ____. |

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DETAILED ACTION

WITHDRAWN

The indicated allowability of claims 21-37 is withdrawn in view of the newly discovered reference(s) to U.S. 6,794,703 B1. Rejections based on the newly cited reference(s) follow.

PRIOR ART REJECTIONS

Statutory Basis

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The Rejections

Claims 21, 28, and 33-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Thakur et al. (U.S. 6,794,703 B1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any

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invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Thakur discloses a capacitor structure with

(21) forming a silicon-germanium alloy layer;

forming an undoped silicon layer that overlies the silicon-germanium alloy layer;

seeding the undoped silicon layer to cluster atoms and thereby form nuclei on a surface of the undoped silicon layer;

annealing the semiconductor structure to grow the nuclei into hemispherical protrusions (see column 8, lines 59-65; column 9, lines 10-52.

Figures 1A-1D);

(28) forming a container in a layer of borophosphorus silicate glass (BPSG);

forming a silicon-germanium alloy layer on a surface of the container and on a surface of the BPSG layer;

forming an undoped silicon layer that overlies the silicon-germanium alloy layer;

removing the portions of the silicon-germanium alloy and undoped silicon layer that are lying on a surface of the BPSG layer;

removing a portion of the BPSG to expose an outer surface of the silicon-germanium alloy layer;

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forming hemispherical protrusions on a surface of the undoped silicon layer (see column 7, lines 30-37; column 8, lines 59-65; column 9, lines 10-52.

Figures 1A-1D);

(33) forming a container in a layer of borophosphorus silicate glass (BPSG);

forming a silicon-germanium alloy layer on a surface of the container, the silicon-germanium alloy having an outer surface abutting the BPSG layer and having an inner surface;

removing portions of the silicon-germanium alloy overlying a surface of the BPSG layer;

removing portions of the BPSG layer to expose at least a portion of the outer surface of the silicon-germanium layer;

depositing an undoped silicon layer over the inner surface and exposed outer surface of the silicon-germanium alloy layer;

converting the undoped silicon layer into hemispherical protrusions (see column 7, lines 30-37; column 8, lines 59-65; column 9, lines 10-52. Figures 1A-1D);

(34) wherein converting includes seeding the undoped silicon layer to cluster atoms to form nuclei (see Figures 1A-1D);

(35) wherein converting includes annealing the semiconductor structure to grow the nuclei into hemispherical protrusions (see Figures 1A-1D);

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(36) further comprising depositing a dielectric layer over the hemispherical protrusions, and wherein the dielectric layer conforms to the hemispherical protrusions (see Figures 1A-1D);

(37) further comprising depositing a conductive layer over the dielectric layer, and wherein the silicon-germanium alloy, the dielectric layer and the conductive layer define a capacitor structure (see Figures 1A-1D).

PRIOR ART REJECTIONS

Statutory Basis

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The Rejections

Claims 22-27 and 29-32 rejected under 35 U.S.C. 103(a) as being unpatentable over Thakur et al. (U.S. 6,794,703 B1).

Thakur teaches everything above except for the specific annealing temperatures, duration time and chemical mechanical planarizing. However, the specific annealing temperatures, duration time and chemical mechanical planarizing are considered obvious. Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention was made to modify

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the teachingThakur. Doing so would facilitate the manufacture of the semiconductor device and improve the productivity of a semiconductor structure. It also has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art and it is noted that the applicant does not disclose criticality in the ranges claimed. In re Aller, 105 USPQ 233 (see MPEP 2144.05).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuong A. Luu whose telephone number is (571) 272-1902. The examiner can normally be reached on M-F (6:15-2:45).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Chuong Anh Luu
Patent Examiner
December 05, 2005